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202201UECM3473OE5b

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Review of preview

Started on	Tuesday, 12 April 2022, 10:04 AM
Completed on	Tuesday, 12 April 2022, 10:04 AM
Time taken	5 secs
Grade	**0** out of a maximum of 10 (**0**%)

1

Marks: 1

For a group of auto policyholders, you are given:

- The number of claims for each policyholder has a conditional Poisson distribution.
- During Year 1, the following data are observed:

Number of Claims	number of Policyhoders
0	13070
1	5920
2	2220
3	405
4	125
5+	0

A randomly selected policyholder had 2 claims in Year 1.
Determine the semiparametric empirical Bayes estimate of the number of claims in Year 2 for the same policyholder. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.730373
Marks for this submission: 0/1.

2

Marks: 1

The following information comes from a study of robberies of convenience stores over the course of a year:

- X_i is the number of robberies of the ith store, with i = 1, 2, ..., 430.
- $\Sigma X_i = 100$
- $\Sigma X_i^2 = 300$
- The number of robberies of a given store during the year is assumed to be Poisson distributed with an unknown mean that varies by store.

Determine the semiparametric empirical Bayes estimate of the expected number of robberies

next year of a store that reported 0 robberies during the studied year. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.083838
Marks for this submission: 0/1.

3

Marks: 1

- During a single 6-years period, 100 policies had the following total claims experience:

Number of Claims in Year 1 through Year 6	Number of Policies
0	36
1	35
2	19
3	7
4	3

- The number of claims per year follows a Poisson distribution.
- Each policyholder was insured for the entire period.

A randomly selected policyholder had 0 claims over the period. Using the semiparametric emprical Bayes estimation, determine the Buhlmann estimate for the number of claims in Year 7 for the same policyholder. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.169093
Marks for this submission: 0/1.

4

Marks: 1

For a large sample of insureds, the observed relative frequency of claims during an observation period is as follows:

Number of Claims	Relative Frequency of Claims
0	61.48 %
1	27.84 %
2	7.16 %
3	1.67 %
4	1.85 %
5+	0

Assume that for a randomly chosen insured, the underlying conditional distribution of number of claims per period given the parameter Θ is Poisson with parameter Θ. Given and individual who had *c* claims in the observation period. The semi empirical Bayesian estimate of the expected number of claims that the individual will have in the next period is 0.417432. Determine *c*.

_____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0
Marks for this submission: 0/1.

5 Marks: 1

The number of claims submited by seven policyholders over three months is shown in the following table:

	January	February	March
A	0	0	1
B	1	2	1
C	3	1	2
D	3	3	2
E	0	1	2
F	0	1	2
G	1	0	3

The number of claims for the following year is estimated using empirical Bayes semiparametric methods. It is assumed that each policyholder's annual claims follow a Poisson distribution. Unbiased estimators are used for the expected value of the process variance and the variance of hypothetical means. Calculate the credibility projection of the annual number of claims for policyholder A. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 14.127681
Marks for this submission: 0/1.

6 Marks: 1

You are given the followings:

- The number of losses arising from m + 57 individual insureds over a single period of observation is distributed as follows:

Number of Losses	Number of Insureds
0	m
1	37
2	20
3 or more	0

- The number of losses for each insured follows a Poisson distribution, but the mean of each such distribution may be different for individual insureds.
- The variance of the hypothetical means is to be estimated from the data.

Determine the smallest value of m(can be non integer) for which the estimate of the variance of the hypothetical means will be greater than 0. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 89.3
Marks for this submission: 0/1.

7 Marks: 1

For a group of auto policyholders, you are given:

- The number of claims for each policyholder has a conditional Geometric distribution.
- During Year 1, the following data are observed:

Number of Claims	number of Policyhoders
0	14800
1	2570
2	1410
3	150
4	110
5+	0

A randomly selected policyholder had 0 claims in Year 1. Determine the semiparametric empirical Bayes estimate of the number of claims in Year 2 for the same policyholder. _____

Answer:

✗

Make comment or override grade

Incorrect
Correct answer: 0.3138
Marks for this submission: 0/1.

8 Marks: 1

Past data on two group policyholders are available and are given in the following table. Determine the estimated total credibility premium to be charged to the first group in year 4.

	Policyholder	Year 1	Year 2	Year 3	Year 4
Total Claims	1	-	11100	12250	-
No. in Group		-	80	150	100
Total Claims	2	21700	24000	24450	-
No. in Group		70	130	190	-

_____

Answer:

✗

Make comment or override grade

Incorrect
Correct answer: 13799
Marks for this submission: 0/1.

9 Marks: 1

For an insurance coverage, claim frequency is assumed to follow a Poisson distribution. You have observed the following experience for one year:

Number of claims	Number of insureds
0	62
1	14
2	3

Empirical Bayes semi-parametric credibility methods are used.\ Calculate the expected number of claims in the following year for an insured who had no claims in the observed period. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.238785
Marks for this submission: 0/1.

10 Marks: 1

The following information comes from a study of robberies of convenience stores over the course of a year:

- X_i is the number of robberies of the i^{th} store, with i = 1, 2,... 500.
- $\Sigma X_i = 2{,}579$
- $\Sigma X_i^2 = 17{,}709$
- The number of robberies of a given store during the year is assumed to be Poisson distributed with an unknown mean that varies by store.

Determine the semiparametric empirical Bayes estimate of the expected number of robberies next year of a store that reported no robberies during the studied year. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 3.0128
Marks for this submission: 0/1.

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